

What is claimed is:

1. An electronically tunable RF Front End Module, comprising:
 - an antenna for transmitting and receiving a plurality of RF signals;
 - 5 a first RF switch in communication with said antenna for switching a plurality of groups of RF signals;
 - a second RF switch in communication with said first RF switch for switching between transmit and receive signals;
 - a tunable band pass filter associated with said second RF switch
 - 10 for distinguishing received selected RF signals from said plurality of received RF signals;
 - a low pass filter associated with said second RF switch for transmitting selected RF signals from said plurality of RF signals;
 - a third RF switch in communication with said first RF switch for
 - 15 switching between transmit and receive signals;
 - a tunable band pass filter associated with said third RF switch for distinguishing received selected RF signals from said plurality of received RF signals; and
 - a low pass filter associated with said third RF switch for
 - 20 transmitting selected RF signals from said plurality of RF signals.
2. The electronically tunable RF Front End Module of claim 1, wherein said tunable band pass filter associated with said second RF

switch for distinguishing received selected RF signals from said plurality of received RF signals, distinguishes between frequencies in the DCS and PCS bands.

5 3. The electronically tunable RF Front End Module of claim 1, wherein said low pass filter associated with said second RF switch for transmitting selected RF signals from said plurality of RF signals, selectively transmits signals in the DCS and PCS frequency bands.

10 4. The electronically tunable RF Front End Module of claim 1, wherein said tunable band pass filter associated with said third RF switch for distinguishing received selected RF signals from said plurality of received RF signals distinguishes between frequencies in the GSM 800 and GSM 900 bands.

15 5. The electronically tunable RF Front End Module of claim 1, wherein said low pass filter associated with said third RF switch for transmitting selected RF signals from said plurality of RF signals, selectively transmits signals in the GSM 800 and GSM 900 frequency
20 bands.

6. The electronically tunable RF Front End Module of claim 1, wherein said tunable band pass filter associated with said second RF switch utilizes voltage tunable dielectric capacitors to enable tuning.

5 7. The electronically tunable RF Front End Module of claim 1, wherein said tunable band pass filter associated with said second RF switch utilizes MEM varactors to enable tuning.

10 8. The electronically tunable RF Front End Module of claim 7, wherein said MEM varactors use a parallel plate varactor topology.

9. The electronically tunable RF Front End Module of claim 7, wherein said MEM varactors use an interdigital varactor topology.

15 10. The electronically tunable RF Front End Module of claim 1, wherein said tunable band pass filter associated with said second RF switch utilizes semiconductor tunable varactors to enable tuning.

20 11. The electronically tunable RF Front End Module of claim 1, wherein said tunable band pass filter associated with said third RF switch utilizes voltage tunable varactors to enable tuning.

12. The electronically tunable RF Front End Module of claim 1, wherein said tunable band pass filter associated with said third RF switch utilizes MEM tunable varactors to enable tuning.

5 13. The electronically tunable RF Front End Module of claim 1, wherein said tunable band pass filter associated with said third RF switch utilizes semiconductor tunable varactors to enable tuning.

10 14. The electronically tunable RF Front End Module of claim 1, further comprising:

a duplexer associated with said second RF switch, said duplexer outputting an RF signal to a bandpass filter for transmitting a selected RF signal and receiving a selected RF signal from said bandpass filter.

15 15. A method of electronically tuning an RF front end using an RF Front End Module, comprising:

transmitting and receiving a plurality of RF signals via an antenna;

switching a plurality of RF signals by frequency bands with a first RF switch in communication with said antenna;

20 switching between transmit and receive signals with a second RF switch in communication with said first RF switch;

distinguishing received selected RF signals from said plurality of received RF signals with a tunable band pass filter associated with said second RF switch;

transmitting selected RF signals from said plurality of RF signals with a low pass filter associated with said second RF switch;

switching between transmit and receive signals by a third RF switch in communication with said first RF switch;

distinguishing received selected RF signals from said plurality of received RF signals with a tunable band pass filter associated with said third RF switch; and

transmitting selected RF signals from said plurality of RF signals with a low pass filter associated with said third RF switch.

16. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said tunable band pass filter associated with said second RF switch for distinguishing received selected RF signals from said plurality of received RF signals, distinguishes between frequencies in the DCS and PCS bands.

17. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said low pass filter associated with said second RF switch for transmitting selected RF signals from said

plurality of RF signals, selectively transmits signals in the DCS and PCS frequency bands.

5 18. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said tunable band pass filter associated with said third RF switch for distinguishing received selected RF signals from said plurality of received RF signals distinguishes between frequencies in the GSM 800 and GSM 900 bands.

10 19. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said low pass filter associated with said third RF switch for transmitting selected RF signals from said plurality of RF signals, selectively transmits signals in the GSM 800 and GSM 900 frequency bands.

15 20. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said tunable band pass filter associated with said second RF switch utilizes voltage tunable dielectric capacitors to enable tuning.

20 21. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said tunable band pass filter

associated with said second RF switch utilizes MEM varactors to enable tuning.

22. The method of electronically tuning an RF front end using an RF Front End Module of claim 21, wherein said MEM varactors use a parallel plate varactor topology.

23. The method of electronically tuning an RF front end using an RF Front End Module of claim 21, wherein said MEM varactors use an interdigital varactor topology.

24. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said tunable band pass filter associated with said second RF switch utilizes semiconductor tunable varactors to enable tuning.

25. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said tunable band pass filter associated with said third RF switch utilizes voltage tunable varactors to enable tuning.

26. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said tunable band pass filter

associated with said third RF switch utilizes MEM tunable varactors to enable tuning.

27. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said tunable band pass filter associated with said third RF switch utilizes semiconductor tunable varactors to enable tuning.

28. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, further comprising:

outputting a duplexed RF signal, duplexed via a duplexer associated with said second RF switch, to a bandpass filter for transmitting a selected RF signal and receiving a selected RF signal from said bandpass filter.

29. The method of electronically tuning an RF front end using an RF Front End Module of claim 15, wherein said selected transmitted RF signal and selected received RF signal is a signal in the UMTS frequency band.

30. The electronically tunable RF Front End Module of claim 14, wherein said selected transmitted RF signal and selected received RF signal is a signal in the UMTS frequency band.

31. An electronically tunable RF Front End Module, comprising:

a first tunable bandpass filter, said first tunable bandpass filter capable of being tuned to receive a plurality of distinct frequency bands;

5 a first lowpass filter capable of transmitting predetermined frequency bands;

a first switch in communication with said first lowpass filter and said first tunable bandpass filter for switching between said first tunable bandpass filter and said first low pass filter to enable switching between transmitting and reception of RF signals;

10 a second tunable bandpass filter, said second tunable bandpass filter capable of being tuned to receive a plurality of distinct frequency bands;

a second lowpass filter capable of transmitting predetermined frequency bands;

15 a second switch in communication with said second lowpass filter and said second tunable bandpass filter for switching between said second tunable bandpass filter and said second low pass filter to enable switching between transmitting and reception of RF signals; and

20 an antenna in communication with a third switch, said third switch enabling switching between said first and said second switch.

32. The electronically tunable RF Front End Module of claim 31, wherein said first tunable bandpass filter capable of being tuned to receive a plurality of distinct frequency bands tuned to receive frequencies in the DCS and PCS bands.

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33. The electronically tunable RF Front End Module of claim 31, wherein said first lowpass filter capable of transmitting predetermined frequency bands, transmits signals in the DCS and PCS frequency bands.

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34. The electronically tunable RF Front End Module of claim 31, wherein said second tunable bandpass filter capable of being tuned to receive a plurality of distinct frequency bands receives frequencies in the GSM 800 and GSM 900 bands.

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35. The electronically tunable RF Front End Module of claim 31, wherein second lowpass filter capable of transmitting predetermined frequency bands transmits signals in the GSM 800 and GSM 900 frequency bands.

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36. The electronically tunable RF Front End Module of claim 31, wherein said first tunable band pass filter utilizes voltage tunable dielectric capacitors to enable tuning.

37. The electronically tunable RF Front End Module of claim 31, wherein said first tunable band pass filter utilizes MEM varactors to enable tuning.

5 38. The electronically tunable RF Front End Module of claim 37, wherein said MEM varactors use a parallel plate varactor topology.

40. The electronically tunable RF Front End Module of claim 37, wherein said MEM varactors use an interdigital varactor topology.

10 41. The electronically tunable RF Front End Module of claim 31, wherein said first tunable band pass filter utilizes semiconductor tunable varactors to enable tuning.

15 42. The electronically tunable RF Front End Module of claim 31, wherein said second tunable band pass filter utilizes voltage tunable varactors to enable tuning.

20 43. The electronically tunable RF Front End Module of claim 31, wherein said second tunable band pass filter utilizes MEM tunable varactors to enable tuning.

44. The electronically tunable RF Front End Module of claim 31, wherein said second tunable band pass filter utilizes semiconductor tunable varactors to enable tuning.

5 45. The electronically tunable RF Front End Module of claim 31, further comprising:

a duplexer associated with said first RF switch, said duplexer outputting an RF signal to a bandpass filter for transmitting a selected RF signal and receiving a selected RF signal from said bandpass filter.

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46. The electronically tunable RF Front End Module of claim 45, wherein said selected transmitted RF signal and selected received RF signal is a signal in the UMTS frequency band.

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